

PHASE I: CONCEPT EXPLORATION

Step 4.0 Plan and Conduct HF/S Test and Evaluation

Objective: The HF/S T&E Program should focus on the overall structure, major elements, and objectives of the test program that is consistent with the CG resource acquisition strategy. It should include sufficient detail to ensure the timely availability of both existing and planned test resources required to support the HF/S test and evaluation program. The HF/S T&E Program Plan will input HF/S requirements to the TEMP which is used to generate detailed test and evaluation plans and to ascertain schedule and resource implications associated with the overall test and evaluation program.

The objectives of the HF/S T&E Program are as follows:

- Identify HF/S issues specifically addressing the acceptability of human performance and safety
- Identify HF/S T&E requirements, methods, and measures for Developmental T&E
- Identify HF/S T&E requirements, methods, and measures for Operational T&E

Inputs: HF/S Measures of Effectiveness.

Outputs: Results of tests and evaluations.

4.1 Identify T&E issues

- 4.1.1 Identify questions to be resolved through HF/S test and evaluation
- 4.1.2 Identify situations where test and evaluation data will support tradeoffs
- 4.1.3 Identify HF/S inputs to development test and Evaluation (DT&E)
- 4.1.4 Identify HF/S inputs to operational test and evaluation (OT&E)
- 4.1.5 Identify HF/S T&E conducted as part of system level T&E
- 4.1.6 Identify categories of HF/S T&E required

4.2 Identify T&E objectives

- 4.2.1 Identify overall objectives of HF/S T&E
- 4.2.2 Identify sub-objectives of HF/S T&E
- 4.2.3 Integrate HF/S T&E objectives with system-level T&E objectives

4.3 Identify system features to be evaluated

- 4.3.1 Identify hardware design features to be evaluated
- 4.3.2 Identify software design features to be evaluated
- 4.3.3 Identify system-level design features to be evaluated
- 4.3.4 Identify procedures design features to be evaluated
- 4.3.5 Identify documentation design features to be evaluated
- 4.3.6 Identify communications design features to be evaluated
- 4.3.7 Identify information handling design features to be evaluated
- 4.3.8 Identify environmental features to be evaluated
- 4.3.9 Identify job design features to be evaluated
- 4.3.10 Identify aspects of human performance to be evaluated
- 4.3.11 Identify aspects of human safety and health to be evaluated
- 4.3.12 Identify training features to be evaluated
- 4.3.13 Identify aspects of system manning to be evaluated
- 4.3.14 Integrate system features to be evaluated

4.4 Identify test conditions

- 4.4.1 Identify sources of information on test conditions
- 4.4.2 Identify operational conditions to be evaluated or included in the evaluation as a control condition
- 4.4.3 Identify conditions of readiness to be evaluated or included in the evaluation as a control condition
- 4.4.3 Identify workload conditions to be evaluated or included in the evaluation as a control condition
- 4.4.4 Identify personnel conditions to be evaluated or included in the evaluation as a control condition
- 4.4.5 Identify operational conditions to be evaluated or included in the evaluation as a control condition

4.4.6 Identify environmental conditions to be evaluated or included in the evaluation as a control condition

4.4.7 Integrate information on test conditions

4.5 Identify T&E data requirements

4.5.1 Identify test data validity requirements

4.5.2 Identify test data reliability requirements

4.5.3 Identify test data usability requirements

4.5.4 Identify test data accuracy requirements

4.6 Identify T&E methods

4.6.1 Identify candidate methods

4.6.2 Identify constraints on method selection

4.6.3 Identify considerations in method selection

4.6.4 Identify advantages and disadvantages of alternate T&E methods

4.6.5 Select T&E methods

4.7 Identify T&E measures

4.7.1 Identify HF/S T&E data requirements

4.7.2 Define HF/S measures of effectiveness

4.7.3 Identify data to be acquired on each measure

4.7.4 Identify data acquisition and recording requirements

4.7.5 Identify data analysis and integration requirements

4.8 Identify T&E criteria

4.8.1 Identify T&E criteria based on system acquisition/development requirements

4.8.2 Identify T&E criteria based on lessons learned

4.8.3 Identify T&E criteria based on HF/S principles and design criteria

4.9 Develop test plan

- 4.9.1 Collect HF/S T&E requirements and approaches for individual tests
- 4.9.2 Develop experiment designs
- 4.9.3 Identify requirements for mock-ups, models, facilities and instrumentation
- 4.9.4 Describe individual tests and evaluation procedures
- 4.9.5 Describe test procedures for experimenter and subjects
- 4.9.6 Integrate tests
- 4.9.7 Schedule tests

4.10 Provide inputs to the Test and Evaluation Master Plan (TEMP)

- 4.10.1 Prepare HF/S inputs to Developmental Test and Evaluation (DT&E)
 - Prepare HF/S inputs to the DT&E Outline which will summarize how DT&E will:
 - verify the effectiveness and safety of personnel
 - verify the status of human engineering design of human machine interfaces;
 - verify that design risks have been minimized;
 - verify that required information is available when needed in a usable format;
 - substantiate achievement of HF/S contract technical performance requirements;
 - certify personnel readiness for dedicated operational test;
 - identify any HF/S technology/subsystem that has not demonstrated its ability to contribute to system performance and to fulfill mission requirements.
 - identify design risks:
 - risks due to human error
 - risks due to expected accident rates
 - risks due to unacceptable performance levels
 - risks due to expected inadequate productivity
 - risks due to expected ineffective training
 - risks due to expected excessive workloads
 - risks due to inadequate function allocation
 - risks due to excessively complex tasks
 - risks due to expected health hazards
 - Identify the roles and contributions of HF/S in system-level and total CG resource DT&E exercises
 - Identify HF/S DT&E issues:
 - Identify questions to be resolved through HF/S test and evaluation
 - Identify situations where HF/S test and evaluation data will support development of human machine interface design concepts and tradeoffs
 - Identify requirements for HF/S DT&E exercises
 - Identify specific human performance test requirements
 - Identify human workload test requirements
 - Identify human safety test requirements
 - Identify human reliability test requirements

- Identify HF/S DT&E requirements
 - Identify extent to which DT&E data will influence selection of design concepts, and incorporate into DT&E planning
 - Identify drawings, engineering models, mock-ups, etc., available for HF/S DT&E
 - Identify extent to which results of evaluations of predecessor systems will input HF/S DT&E exercises
 - Identify T&E objectives
 - Identify overall objectives of HF/S DT&E
 - Identify sub-objectives of HF/S DT&E
 - Integrate HF/S DT&E objectives with system-level T&E objectives
 - Identify system features to be evaluated in DT&E
 - Identify DT&E test conditions
 - Identify DT&E data requirements
 - Identify DT&E methods
 - Identify DT&E measures
 - Identify DT&E criteria
 - Develop HF/S DT&E test plan

4.10.2 Prepare HF/S inputs to Operational T&E (OT&E)

- Prepare HF/S inputs to the Operational Test and Evaluation Outline
 - Critical operational issues as they impact human performance, readiness, and safety.
 - Operational Test and Evaluation to Date,
 - Required future Operational Test and Evaluation including configuration description; T&E objectives; T&E events, scope of testing, and basic scenarios; and limitations which may affect the evaluator's ability to draw conclusions, impact of these limitations, and resolution approaches.
 - Specific HF/S inputs to the Operational Test and Evaluation Outline will summarize how operational T&E will:
 - identify scenarios which should be included in OT&E as situations wherein human performance and/or safety would be challenged;
 - identify operational conditions to be included in OT&E as test conditions;
 - verify the adequacy of individual human performance;
 - verify the adequacy of team performance;
- Identify the roles and contributions of HF/S in system-level and total CG resource OT&E exercises
- Identify HF/S OT&E issues:
 - Identify questions to be resolved through HF/S test and evaluation
 - Identify situations where HF/S test and evaluation data will support development and evaluation of human machine interface design concepts and tradeoffs
- Identify requirements for HF/S OT&E exercises
 - Identify specific human performance test requirements
 - Identify human workload test requirements
 - Identify human safety test requirements
 - Identify human reliability test requirements
- Identify HF/S OT&E requirements
 - Identify extent to which OT&E data will influence selection of design concepts,

and incorporate into DT&E planning

- Identify extent to which results of evaluations of predecessor systems will input HF/S DT&E exercises
- Identify T&E objectives
 - Identify overall objectives of HF/S OT&E
 - Identify sub-objectives of HF/S OT&E
 - Integrate HF/S OT&E objectives with system-level T&E objectives
- Identify system features to be evaluated in OT&E
- Identify OT&E test conditions
- Identify OT&E data requirements
- Identify OT&E methods
- Identify OT&E measures
- Identify OT&E criteria
- Develop HF/S OT&E test plan

4.11 Conduct HF/S T&E

4.11.1 Select and prepare test subjects

4.11.2 Acquire and prepare test materials

4.11.3 Acquire and prepare test instrumentation

4.11.4 Identify test initial conditions

4.11.5 Initiate tests

4.11.6 Monitor the progress of tests

4.11.7 Terminate testing

4.12 Prepare T&E reports

4.12.1 Analyze test data

4.12.2 Interpret test data in terms of test objectives

4.12.3 Prepare test reports